

# PFC Heat Transfer & Fluid Flow Session Summary

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PFC Meeting – Sandia, Livermore, CA – 6-8 Dec 2004

## Introduction & SOFT2004 *Nygren (SNL)*

- *EU activity in He-cooled PFCs, W and PS-W structures, new HHF facilities and liquid metals.*
- *Strong participation by EU industry and support for fusion and ITER via EFDA and the FCC.*

## Progress in modeling of He-cooled porous media *Youchison (SNL)*

- *Innovative approach by Youchison and Adaptive Research treats physics of flow through porous media with varying pore features.*
- *Flow through ligamentary and other structures can be simulated by full 3-D CFD treatment (rather than smeared approximations).*

## **PFC Dec04: Heat Transfer & Fluid Flow Summary**

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### ***ELM heat load simulations on W rods and ITER Module 18 Nygren***

- *Strong interest by ITER in high cycle ELM heat load tests to investigate potential damage mechanisms. Sandia testing will restart this winter.*
- *ITER has no detailed design for (US) FW Mod18 and design work is beginning. An EM analysis to show segmentation should precede detailed layout of cooling channels. Expand US design effort is needed just to cover rudimentary analyses for conceptual design.*

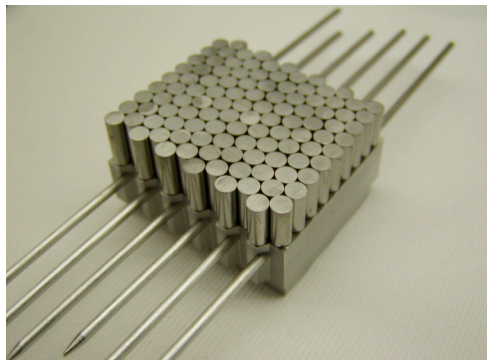
### ***Be-armored FW mockups for JET & ITER Youchison & Hollis (LANL)***

- *LANL has fabricated Be mockups for the EU and for the US at its Be plasma spray facility.*
- *A “checkerboard” relief pattern on the substrate gives a morphology of the PS Be armor that predisposes preferred paths for cracking.*
- *Recently built ALNL mockups are now being tested at Sandia.*

## PFC Dec04: Heat Transfer & Fluid Flow Summary

### ***Development and testing of W-rod tiles for C-Mod Nygren***

- *MIT and Sandia collaborated on C-MOD tiles armored with W rods. MIT hopes to install 12 tiles in C-MOD for the next campaign.*
- *Original tiles (W rods pinned in base) formed a plasma in EBTS.*
- *Better grounding was needed; a brazed solution was effected.*
- *Brazed tiles worked. Sandia optimized braze process and brazed tiles for C-MOD.*



Bruce, [Lipschultz]

Not sure if Sam told you, but the brazed tiles are back from Sandia. They look beautiful. I've looked down every hole with the microscope in two of the tiles so far, and the braze flowed well w/o any excess...

Thank you Sandia....  
Jim [Irby]